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August 4, 1993

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W. - Room 222
Washington, D. C. 20554

Re: Ex Parte Presentation MM Docket No. 87-268

Dear Mr. Caton:

On August 3, 1993, James Carnes of The David Sarnoff Research Center, Quincy Rodgers of General Instrument, Joseph Donahue of Thomson Consumer Electronics, Wayne Luplow of Zenith Electronics, Thomas Patton of North American Philips and I met with several groups at the FCC to discuss the so-called "Grand Alliance" of HDTV proponents and the combined HDTV system which the Alliance members, including the Massachusetts Institute of Technology, have proposed as the nation's HDTV transmission standard.

We met with Jonathan Cohen of Chairman Quello's office and Robert Pepper of the Office of Plans and Policy; Commissioner Duggan and John Hollar; Commissioner Barrett, Byron Marchant, James Coltharp and Harold Hewell; and Roy Stewart, William Hassinger, Alan Stillwell, Robert Eckert, Robert Ratcliffe, John Karousos, Julius Knapp and Karl Kensinger of the Mass Media Bureau and the Office of Engineering and Technology. The attached materials were discussed in the meetings.

Because the meetings concluded late in the day, two copies of this Notice were submitted on the following day to the Secretary of the FCC in accordance with Section 1.1206(a)(1) of the Commission's Rules.

Sincerely,

Robert K. Graves

Attachment

cc: Meeting Participants

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List A B C D E

# THE HDTV GRAND ALLIANCE

Toward a New Era of Television

## OVERVIEW

On May 24, 1993, the three groups that had developed world-leading digital high-definition television (HDTV) systems agreed to devote their efforts to developing a single, best-of-the-best system to propose as the standard for the nation's next generation of TV technology.

The three groups -- AT&T and Zenith Electronics Corporation, General Instrument Corporation and the Massachusetts Institute of Technology, and a consortium of North American Philips, Thomson Consumer Electronics and the David Sarnoff Research Center -- are now all working together as the HDTV "Grand Alliance."

An exciting new model for government/industry cooperation, the Grand Alliance creates a collaborative effort with a pool of technical talent and financial resources that should ensure that North America is the first to deploy and profit from this important new digital technology.

While the process to date of formulating an HDTV standard has concentrated on selecting the best system from among those proposed, under the Grand Alliance, the best features of all the systems can now be combined to produce a system superior to that of any one of the individual proponents. The Grand Alliance approach is good news for everyone -- consumers, broadcasters, cable operators, the computer, consumer electronics and telecommunications industries, as well as for U.S. workers. The proposal

addresses the needs of these key constituencies and incorporates capabilities that are vital to each of them. For instance, the system incorporates progressive scan transmission capability and square pixel capability, two attributes that are extremely important to the computer industry for promoting interoperability with computers and telecommunications. Likewise, concerns expressed by many broadcasters have been addressed by including interlaced scan transmission in the initial deployment.

The proposal will allow the U.S. to maintain the worldwide technological lead it has established. The rapid adoption of an all-digital HDTV system will promote the creation and maintenance of U.S. high-skilled jobs in the design and manufacture of HDTV receivers, displays, studio and transmission equipment, peripheral equipment, programming and software development, and semiconductor products.

Consumers will reap the benefits of the best technical minds collaborating to bring noise-free, theater-quality pictures and sound to American homes, as well as a host of new applications in home entertainment, education, computer and medical imaging, factory automation, publication, etc. -- all stimulated by the early adoption of this technology.

The formation of the Grand Alliance has eliminated the need for another round of testing on the individual systems, the results of which could have been inconclusive. Thus, the formation of the Grand Alliance could save a year or more in the implementation of HDTV, not only by reducing the risk of inconclusive test results, but by lessening the possibility of legal or other challenges.

If accepted by the Advisory Committee on Advanced Television Service ("Advisory

Committee" or "ACATS") and by the FCC, the system will speed the implementation of HDTV and enable the U.S. to maintain and enhance its worldwide lead in the development of this vital new technology.

**THE PROCESS**

The HDTV standard-setting process has been and will continue to be a public, open process. At the same time, the process must proceed as rapidly as possible if U.S. consumers and the U.S. economy are to capitalize on this critical new technology. These are the next steps in the process:

- The Advisory Committee has reconvened its Technical Subgroup to evaluate the Grand Alliance proposal in detail. If necessary, this group may negotiate changes to the proposed system with the alliance members. In the meantime, the alliance members are finalizing the specifications of the combined system in a few areas that are not yet fully resolved.

- Once the Advisory Committee's Technical Subgroup has approved the basic concepts of the combined system, the alliance members will work together to construct the system. After that, the Advisory Committee will conduct extensive laboratory tests to verify that the system meets its expectations. The Advisory Committee could then recommend the system to the FCC and simultaneously begin field test verification of the system's performance.

- The FCC, in turn, would consider the Committee's recommendation in a rulemaking proceeding which we hope could be concluded by the end of 1994. Whatever standard is adopted, the FCC requires that the applicable technology be licensed to anyone on reasonable terms.

Speed is of the essence. The Grand Alliance system, if ultimately accepted by the Advisory Committee and the FCC, will maintain and enhance the U.S. leadership position in digital television technology and in HDTV in particular.

The FCC should not allow any delays in the process to evaluate any additional

proposed system or subsystem for which neither hardware nor software has been implemented, nor should the process be slowed to study the interoperabilty issue even further. Such delays could threaten the U.S. lead in HDTV technology.

## HISTORICAL PERSPECTIVE

The television we watch today uses the NTSC (National Television Systems Committee) standard, finalized in the late 1940s. While that standard has been improved, most notably by the incorporation of color in the 1950s, today's television is based on the same fundamental resolution parameters as the original service, including 525 horizontal lines and interlace scanning. The introduction of color television, approximately 40 years ago, was the last major advancement in the NTSC standard.

In the early 1980s, Japan's NHK developed its MUSE HDTV system, which utilized 1125 horizontal scan lines, and proposed its worldwide adoption. MUSE made the world aware of the goal of "high definition television," with quality equivalent to motion pictures, including a wide screen format. The MUSE system renewed concerns in this country about the capabilities of American technology. Many feared that American companies and American employees would be shut out of a fundamental new technology.

In 1987, at the request of broadcasters, the FCC initiated its rulemaking on advanced television service and established there blue ribbon Advisory Committee for the purpose of recommending a broadcast standard. Former FCC Chairman Richard E. Wiley was appointed to chair this effort and ACATS has become, in some respects, a model for government/industry cooperation.

Several important steps followed:

o ACATS developed a competitive process by which proponents of systems were required to build prototype hardware which would then be thoroughly tested. This process sparked innovation and an entrepreneurial response: initially there were 23 proposals for systems submitted to ACATS in September 1988. (Hardware was actually built and tested for six systems.)

o The FCC made several key spectrum decisions that also helped spark innovation. The Commission decided in early 1990 that new ATV systems would share television bands with existing services and would utilize TV channels as presently defined. The Commission also decided that a simulcast approach, as first proposed by Zenith, would be followed. This meant that a new standard could provide a quantum leap forward from the current NTSC standard and would not be hindered by the requirements of the current standard, except to protect existing broadcast service during a period of transition.

o The FCC anticipated the need for interoperability of the standard with other media. Initially, the focus was on interoperability with cable television and satellite delivery; both were crucial to any broadcast standard. But this acknowledgement of the value of interoperability would also become important to the computer industry when the next technical advance came in the form of digital video compression, and would lead to a broader focus by ACATS, as discussed below.

o Although the FCC had said in the Spring of 1990 that it would determine if all-digital technology was yet feasible, most observers viewed it as at least 10 years in the future. That same year, General Instrument became the first to announce an all-digital system, followed by Zenith-AT&T and the ATRC. (Until then, there had been proposals for utilizing digital compression with analog transmission and proposals for hybrid analog/digital transmission.)

o Proponents announced the use of packetized transmission, headers and descriptors, and composite-coded surround sound. (One proponent, AT/RC, and previously adopted packetized transmission.) These steps were important for the potential interoperability of these systems with computers. The introduction of all-digital systems had made such interoperability a reality.

o All-digital systems set the stage for another important step, which was taken in February 1992, when the Advanced Television Systems Committee ("ATSC") recommended that the new standard include a flexible, adaptive data allocation capability (and that the audio also be upgraded from stereo to surround sound).

Six systems (four of which were all-digital) underwent extensive testing in 1991 and

1992 at the Advanced Television Test Center ("ATTC"), in Alexandria, Virginia. Also participating in testing were CableLabs, which tested systems over a cable television test bed, and the Advanced Television Evaluation Laboratory ("ATEL") in Ottawa, Canada. Canadian participation reflects the goal of creating a unified North American standard.

Following testing, the Advisory Committee reduced the number of proponents to those that had built the four all-digital systems: two systems proposed by GI and MIT; one system proposed by Zenith and AT&T; and one system proposed by the ATRC, consisting of Sarnoff, Philips and Thomson. The Advisory Committee decided that while all of the digital systems provided impressive results, no winner could then be named as the U.S. HDTV standard. The Committee ordered a round of supplementary tests to evaluate improvements that had been made to the individual systems.

**INTEROPERABILITY**

Representatives of the computer industry have made significant contributions to the standards process and to the Grand Alliance system. They participated in the work of ACATS and articulated the need for features that could enhance the interoperability of an all-digital system. The standard will be better than it would have been thanks to their participation.

It is important to recognize the extent of the commitment being made to increase interoperability of HDTV with computers and telecommunications. Participants from non-broadcast industries suggested a number of significant features for the standard which have been incorporated into the Grand Alliance proposal:

- They sought an all-digital U.S. advanced television standard. The proposal is for an all-digital system.
- They said that the digital data stream should have a prioritized and packetized data support structure. The Alliance proposal incorporates such a structure.
- They maintained that the standard should include source adaptive coding. The Alliance proposal does.
- They requested that the standard provide for square pixels to facilitate computer graphics. The Alliance proposal provides for square pixels.
- They requested that the standard utilize a progressive scanning format. The Grand Alliance system includes and endorses progressive scanning and envisions a migration to all progressive scanning.

There are other aspects of the GA system which enhance interoperability with computers and telecommunications. The Grand Alliance system includes many elements of the MPEG-2 compression approach, which is currently in working draft status in the MPEG committee of the International Standards Organization. The Alliance compression system includes additional capabilities as well. The proponents are committed to working together to get these capabilities incorporated in the MPEG standard.

Another aspect of the Grand Alliance system which enhances interoperability is the fixed-length packet format that provides for flexible delivery of video, audio, text, graphics and other data by broadcast, cable, satellite and fiber. This packet data format provides flexibility and a high degree of interoperability with other emerging telecommunications

and data networks that use similar technology, such as Asynchronous Transfer Mode (ATM), the emerging standard for broadband telecommunications networks. Finally, the proposal's packetized data transport structure utilizes universal headers and descriptors to provide flexibility and extensibility, i.e., headroom for future growth of system capabilities.

THE GRAND ALLIANCE

Contact:
Joe Donahue - 202/872-0672
Quincy Rodgers - 202/833-9700

## BRIEF TECHNICAL DESCRIPTION

The technology incorporated in the Grand Alliance combined system can be described in five key areas: scanning format, compression, transmission, audio and communications protocol.

### 1. Scanning Format

The system provides multiple formats to support practical implementations during startup of the service, and yet provides a strong impetus toward the eventual exclusive use of progressive scan in order to facilitate interoperability of HDTV with computers and telecommunications.

The long-term standard will be built around a family of 1050-line progressive formats, at frame rates of 60, 30 and 24 frames per second. 60 frames per second is not practical in the near term, but as technology evolves and improves, this format will be supported with backward compatibility to existing HDTV receivers. 30 and 24 frames per second progressive formats are included in the initial system. These frame rates may be used for film material.

To ensure that practical modes exist for live video, the system will provide both progressive and interlaced formats initially. 787-line progressive modes at 60, 30, and 24 frames per second will be supported. A 1050-line interlaced mode at 60 fields per second will also be supported.

All consumer HDTV sets will be able to receive both progressive and interlaced formats at different frame rates and will be able to convert to the display format of the particular set, if necessary. The added cost to enable sets to receive multiple formats is not unreasonable, and will decrease over time.

All film material will be sent in progressive transmission format. The 1050 and 787-line formats both provide square pixels.

### 2. Compression

The video compression technology used in the combined system incorporates key features from each of the four digital HDTV proposals. The resulting system shares many components from the ISO (International Standard Organization) MPEG-2 proposals, but it is not identical. Parties to the Alliance have agreed to work with the industry and seek support for the combined system in the ISO forum as the MPEG-2 HDTV profile.

3. **Transmission**

Four transmission system approaches will be evaluated further before a final selection is made. The four are variations of Vestigial Sideband (VSB) and Quadrature Amplitude Modulation (QAM) approaches (two each). Analyses based on the existing proponent systems as improved will be conducted. A competitive bakeoff may also be held, if necessary.

4. **Audio**

Three systems are under consideration, and subject to further evaluation: Dolby AC-3, Musicam 5.1 and MIT-AC.

5. **Communications Protocol**

A packetized, prioritized data transport format with universal headers and descriptors will be used to promote system flexibility and extensibility.